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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,041	09/03/2003	Kevin A. McCullough	P00404-US2	2040
3017	7590	03/25/2004	EXAMINER	
BARLOW, JOSEPHS & HOLMES, LTD. 101 DYER STREET 5TH FLOOR PROVIDENCE, RI 02903			SAVAGE, JASON L	
			ART UNIT	PAPER NUMBER
			1775	

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/605,041

Applicant(s)

MCCULLOUGH, KEVIN A.

Examiner

Jason L. Savage

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

Information Disclosure Statement

1. The information disclosure statement filed 1-6-04 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because it contains more than 50 references to US patents (See Official Gazette published on 9-17-02 at 1262 OG 94). In order to put the IDS in compliance, Applicant should submit a first e-IDS containing no more than 50 US patent references and no more than 50 US patent publications and a second e-IDS containing the remaining US patents (See Official Gazette published on 9-17-02 at 1262 OG 94). It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

On page 9, paragraph [0038], line 8 of the specification, in the description of Figure 10 Applicant recites "height H"; however, Figure 10 does not contain the reference number H. It is believed that reference L in Figure 10 was intended to be H

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such as is described in the specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guerriero et al. (US 5,249,620).

Guerriero teaches a molding composition for a casting process for producing composite materials which comprises a metal matrix metal such as Al, Mg, Cu, a first thermally conductive filler such as metal fibers, ceramic fibers such as carbon, ceramic whiskers and/or metal powders and a second thermally conductive filler which may be a non-metal powder such as BN, alumina or carbon in the form of graphite or in the form of metal powders (col. 3, ln. 22-50).

Regarding the claimed volume ranges for each component, in the examples Guerriero teaches that the matrix metal is typically between 50-70% by volume (ex. 3, 6) , a first thermally conductive fiber whisker may be anywhere from 10% to 20% by

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volume (ex. 1, 11), and that the second conductive particulate may be anywhere from 10-30% by volume (ex. 11, 12). Although Guerriero does not exemplify an embodiment wherein between 25-60 % by volume of the composition is the first, high aspect ratio, conductive filler; it does teach multiple embodiments wherein the composition contains 20% by volume of a thermally conductive whisker. Guerriero also does not teach that the first conductive fiber or whiskers can not be in amounts greater than 20% by volume. Absent a teaching of the criticality of claimed 25% by volume of the first conductive filler, it does not provide a patentable distinction over the prior art since it would have been obvious to one of ordinary skill in the art at the time the invention was made to have varied the loading of each component in order to have optimized the strength and hardness exhibited by the composite.

Regarding the claim limitation that the first thermally conductive filler have an aspect ratio of at least 10:1 and the second thermally conductive filler having an aspect ratio of less than 5:1; it is the position of the Examiner that the teaching of fibers and whiskers is a teaching of a component having an aspect ratio is greater than 10:1 and the teaching of particles or powder is a teaching of a component having an aspect ratio of less than 5:1. Furthermore, absent a teaching of the criticality of the claimed aspect ratio ranges, they do no provide a patentable distinction over the prior art.

Regarding the limitation that the filler is evenly dispersed throughout the metallic base matrix to form a uniform composition, Guerriero teaches several methods of forming the composition which would result in a homogenous mixture having a uniform composition including the Method of Reinforcer Agent Dispersion, Method of Dispersion

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of the Reinforcer Agent on a Partially Solid Matrix, Method of Powder Metallurgy (col. 2, In. 24-48). Each of these methods recite stirring or blending the materials prior to the molding step and thus would meet the claim limitations.

Regarding the limitation that the molding composition is used in an injection molding process to form a thermally conductive article, Guerriero is silent to using an injection molding process. However, it would have been within the level of one of ordinary skill to have recognized that there would have been a reasonable expectation of success for using the molding composition of Guerriero in alternate processes such as injection molding. One of ordinary skill would have been motivated to use an alternate method such as injection molding in order to produce complex and precision-shaped parts from a variety of materials at reduced cost to conventional casting processes.

Regarding claims 2 and 12, Guerriero teaches that the matrix metal may be Al, Mg, or Cu (col. 3, In. 34-36).

Regarding the limitations in claims 3-6, 9, 13-16 and 19, although Guerriero does not use the terms flake, rice, strand, spheroid or grain, these structures would have been equivalent to the whiskers and powders taught by Guerriero. Absent a showing of unexpected results, the claimed filler shapes are merely a design choice and does not patentably distinguish the present invention over the prior art of record. Furthermore, it would have been obvious to have used any shape of filler that would have been capable of producing a composite having high conductivity and low thermal expansion properties.

Regarding claims 7 and 17, Guerriero teaches that the first thermally conductive filler may be alumina fibers (col. 3, ln. 39-44).

Regarding claims 8 and 18, Guerriero teaches that the second conductive particles may be BN (col. 3, ln. 47-48).

Regarding claims 10 and 20, Guerriero teaches that the composition may contain metal powder which is the same composition as the matrix metal (col. 4, ln. 20-25). Since Guerriero has previously taught that Al, Mg and Cu are all suitable matrix metals, Al, Mg and Cu would also be suitable as the second conductive particles. Guerriero further teaches that alumina, boron nitride and carbon in the form of graphite are suitable materials for the second conductive particles (col. 3, ln. 22-50).

5. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guerriero et al. (US 5,249,620) in view of Ninomiya et al. (US 5,981,085).

Guerriero teaches what is set forth above and exemplifies embodiments wherein the molding composition contains 20 percent by volume of a high aspect ratio thermally conductive filler (ex. 1, 3-5, 10, and 12-14). Guerriero is silent to the first thermally conductive filler being present between 25-60 volume percent however it does not teach that volume percentages of fibers must be limited to 20 percent.

Ninomiya teaches a highly thermally conductive molding composition comprising a matrix metal and a preform made of a conductive material (col. 11, ln. 63-67). Ninomiya teaches that the conductive material may include a high aspect ratio first thermally conductive fiber and a second low aspect ratio second thermally conductive

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particle (col. 16, ln. 25-45). Ninomiya further teaches that the first thermally conductive high aspect ratio fiber may be present in amounts between 40 to 60% by volume (col. 19, ln. 10-45).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the method of Guerriero with a reasonable expectation of success of producing reinforced conductive articles having high mechanical properties by following the teaching of Ninomiya by adding volume percentages of a high aspect ratio fiber of up to 60 volume percent in the molding composition.

Prior Art Made of Record but not Relied Upon

6. Yang (US 5,977,230) teaches an injection molding composition and process suitable for use with metals, alloys, ceramics, cermets and the like (col. 1, ln. 7-10). Yang further teaches that injection molding is a desirable method to produce complex and precision-shaped parts from a variety of materials which cheaper than conventional casting processes (col. 1, ln. 13-18).

7. Any inquiry to this communication or earlier communications from the Examiner should be directed to Jason Savage, whose telephone number is (703)305-0549. The Examiner can normally be reached Monday to Friday from 6:30 AM to 4:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Deborah Jones, can be reached on (703)308-3822.

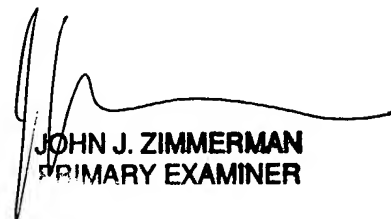
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jason Savage

3-18-04



JOHN J. ZIMMERMAN
PRIMARY EXAMINER